

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: M TECH  
BRANCH: MECH.

SEMESTER : I  
SESSION : MO/19

SUBJECT: CL612 COMPOSITE MANUFACTURING TECHNOLOGY

TIME: 3:00 HOURS

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Describe the classification of reinforcements. Explain in brief about nature of fiber used in polymer composite. [5]
- Q.1(b) List the essential properties necessary for resin to use in composite. Describe the various epoxy resin used in polymer composite. [5]
- Q.2(a) Demonstrate the basics steps of manufacturing carbon fibre from PAN precursor. [5]
- Q.2(b) Distinguish between two different types of glass fibre manufacturing techniques. [5]
- Q.3(a) Define critical fibre length. Derive the expression of critical fibre length. [5]
- Q.3(b) Outline about advantages & disadvantage of hand lay-up techniques over spray up process. [5]
- Q.4(a) Interpret the short fibers reinforce composites? Derive expressions for average fiber stress for fibers of different lengths. [5]
- Q.4(b) Differentiate between prepreg & perform. [5]
- Q.5(a) Outline the filament winding process with diagram, emphasis on processing conditions. [5]
- Q.5(b) Solve-A continuous and aligned glass fiber-reinforced composite consists of 40 vol% of glass fibers having a modulus of elasticity of 47 GPa and 60 vol% of a polyester resin that, when hardened, displays a modulus of 2.9 GPa. [5]
- (a) Compute the modulus of elasticity of this composite in the longitudinal direction.
- (b) If the cross-sectional area is 215 mm<sup>2</sup> and a stress of 40 MPa is applied in this longitudinal direction, compute the magnitude of the load carried by each of the fiber and matrix phases.

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